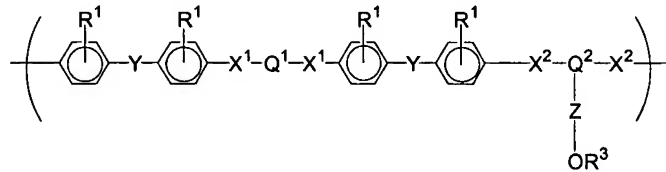


**WHAT IS CLAIMED IS:**

1. A composition made by a process comprising a) providing precursor composition comprising a nonlinear optical chromophore having the structure D- $\pi$ -A and a polymer comprising units having the formula



and b) crosslinking the polymer, wherein:

D is a donor;

$\pi$  is a  $\pi$ -bridge;

A is an acceptor;

$\text{Q}^1$  comprises at least one aryl or heteroaryl group;

$\text{Q}^2$  comprises at least one aryl or heteroaryl group;

$\text{X}^1$  is O bonded directly to an aryl carbon of  $\text{Q}^1$ ;

$\text{X}^2$  is O bonded directly to an aryl carbon of  $\text{Q}^2$ ;

Z is a linker comprising at least one  $-(\text{C}(\text{R}^2)_2)-$  group;

Y is a single bond or a linker group;

$\text{R}^1$  is independently at each occurrence H, a halogen, an alkyl group, a heteroalkyl group, an aryl group, or a heteroaryl group;

$\text{R}^2$  is independently at each occurrence H, an alkyl group, or a heteroalkyl group;

and

$\text{R}^3$  is H or a crosslinkable group.

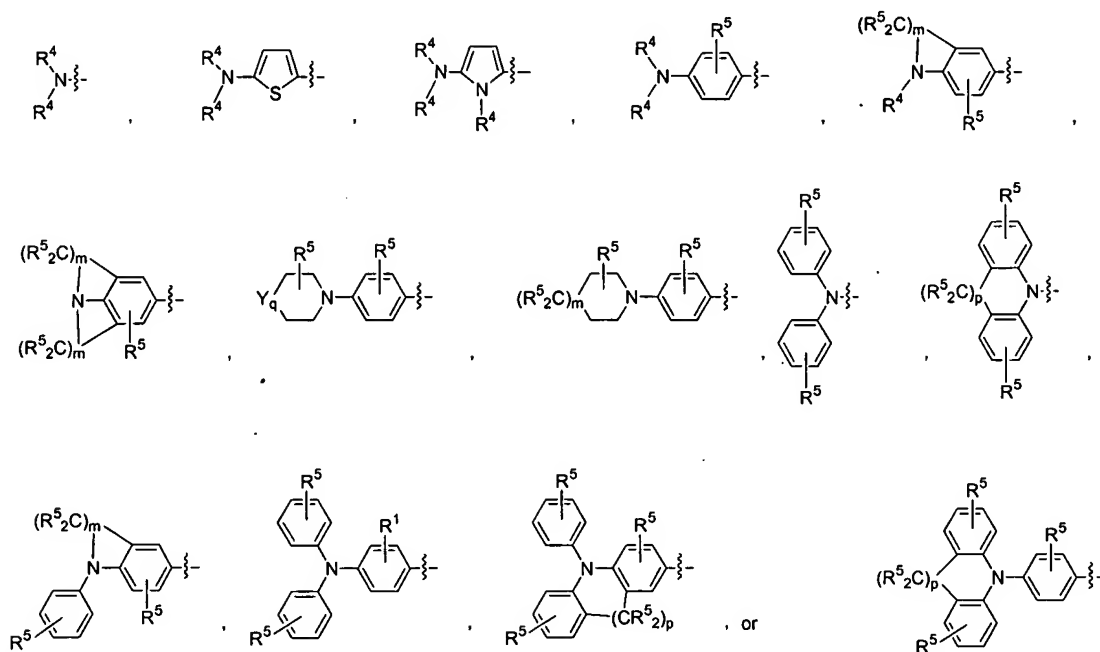
2. The composition of Claim 1, the process further comprising poling the composition by applying an electric field.

3. The composition of Claim 2, wherein poling begins before crosslinking.

4. The composition of Claim 2, wherein poling begins during crosslinking.

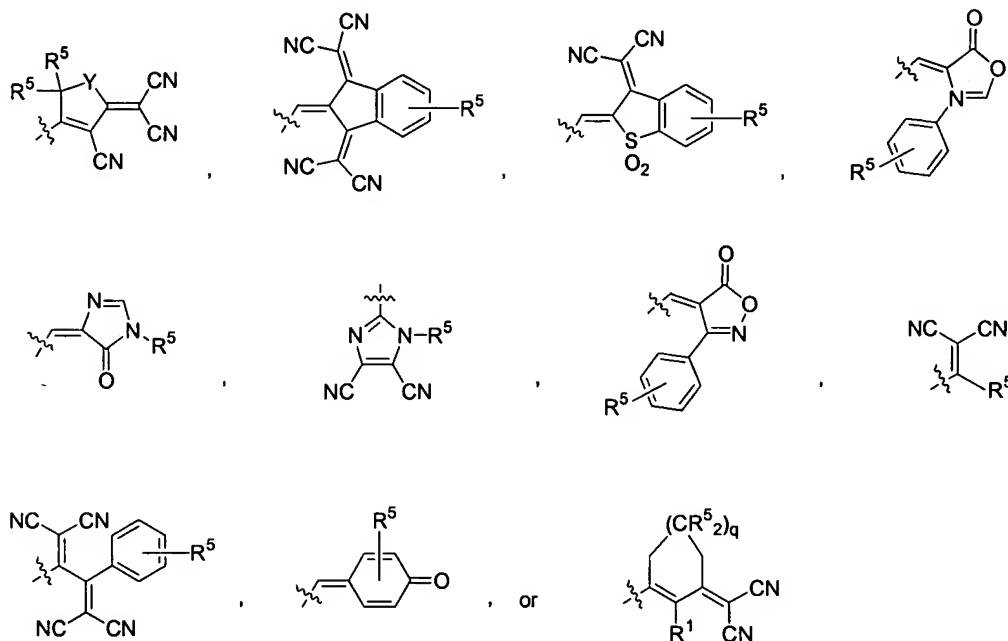
5. The composition of Claim 2, wherein poling begins after crosslinking.

6. The composition of Claim 1, wherein D is selected from the group consisting of



wherein independently at each occurrence:  $R^4$  is H, an alkyl, an aryl, a heteroalkyl group, or a heteroaryl group;  $R^5$  is H, a halogen except when bonded to a carbon alpha to or directly to a nitrogen, O, S, an alkyl group, an aryl group, a heteroalkyl group, or a heteroaryl group; Y is O, S or Se; m is 2, 3 or 4; p is 0, 1 or 2; and q is 0 or 1.

7. The composition of Claim 1, wherein A is selected from the group consisting of

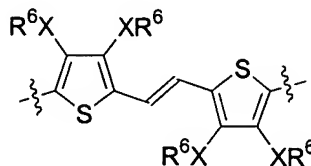


wherein, independently at each occurrence,  $R^5$  is H, a halogen except when bonded to a carbon alpha to or directly to a nitrogen, O, S, an alkyl group, an aryl group, a heteroalkyl group, or a heteroaryl group and Y is O, S or Se.

8. The composition of Claim 1, wherein  $\pi$  comprises a thiophene ring having oxygen atoms bonded directly to the 3 and 4 positions of the thiophene ring.

9. The composition of Claim 8, wherein the oxygen atoms are independently substituted with an alkyl, heteroalkyl, aryl, or heteroaryl group.

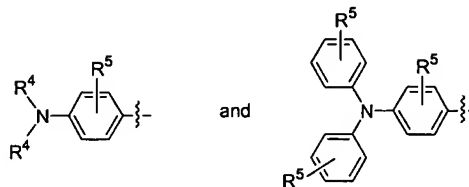
10. The composition of Claim 1, wherein  $\pi$  comprises:



wherein, independently at each occurrence, X is O or S and  $R^6$  is an alkyl, aryl, heteroalkyl, or heteroaryl group.

11. The composition of Claim 10, wherein each X is O and each R<sup>6</sup> is an alkyl group.

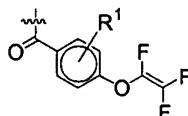
12. The composition of Claim 6, wherein D is selected from the group consisting of



wherein, independently at each occurrence, R<sup>4</sup> is H, an alkyl group, an aryl group, a heteroalkyl group, or a heteroaryl group and R<sup>5</sup> is H, a halogen except when bonded to a carbon alpha to or directly to a nitrogen, O, S, an alkyl group, an aryl group, a heteroalkyl group, or a heteroaryl group.

13. The composition of Claim 6, wherein R<sup>3</sup> comprises a fluorinated crosslinking group and at least one of R<sup>4</sup> or R<sup>5</sup> comprises a fluorinated crosslinking group.

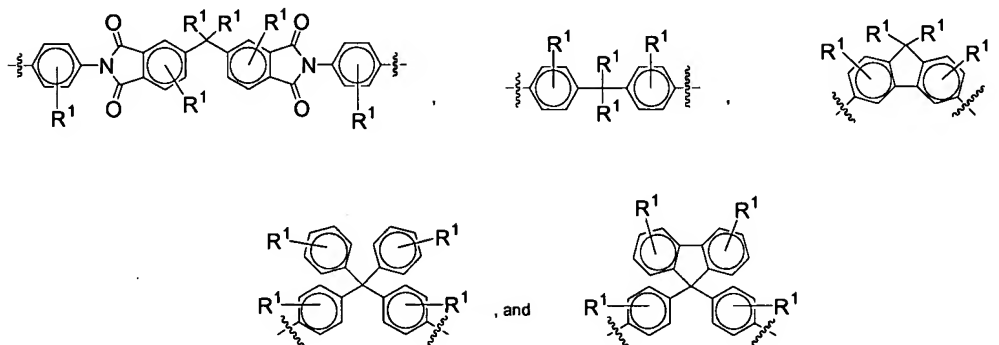
14. The composition of Claim 13, wherein the fluorinated crosslinking group comprises



15. The composition of Claim 1, wherein Q<sup>1</sup> comprises at least two aryl or heteroaryl groups.

16. The composition of Claim 15, wherein Q<sup>1</sup> comprises a methylenediphenyl group in which the methylene carbon is bonded to at least 2 phenyl groups.

17. The composition of Claim 16, wherein  $Q^1$  is selected from the group consisting of

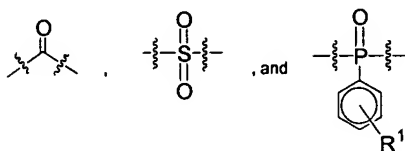


18. The composition of Claim 1, wherein  $Q^1$  comprises a polycyclic aromatic ring system or a polycyclic heteroaromatic ring system.

19. The composition of Claim 1, wherein Y is a single bond, an alkene or an alkyne group.

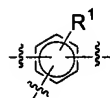
20. The composition of Claim 1, wherein Y is a ketone, a sulfone, or a phosphine oxide group.

21. The composition of Claim 20, wherein Y is selected from the group consisting of



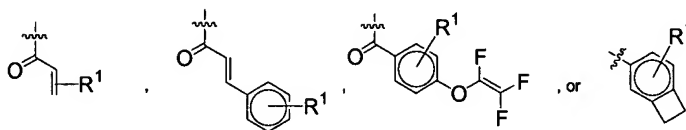
22. The composition of Claim 1, wherein  $Q^2$  comprises a 6-membered aromatic or heteroaromatic ring, a polycyclic aromatic ring system, or a polycyclic heteroaromatic ring system.

23. The composition of Claim 22, wherein  $Q^2$  comprises



24. The composition of Claim 1, wherein Z is  $-(CH_2)_n-$  or  $-(CH_2CH_2O)_n-$ , wherein n = 1 to 10.

25. The composition of Claim 1, wherein  $R^3$  is selected from the group consisting of



26. The composition of Claim 1, wherein:

$Q^1$  comprises a methylenediphenyl group in which the methylene carbon is bonded to at least 2 phenyl groups;

$Q^2$  comprises a phenyl ring;

Y is a single bond;

and

Z is  $-CH_2-$

27. The composition of Claim 26, wherein  $R^1$  is fluorine.

28. The composition of Claim 26, wherein  $R^3$  comprises an aryl trifluorovinyl ether.

29. The composition of Claim 26, wherein the methylene carbon of  $Q^1$  is bonded to at least three phenyl rings.

30. An electro-optic device comprising the composition of Claim 1.

31. The electro-optic device of Claim 30, wherein the electro-optic device is selected from the group consisting of an optical modulator, an optical switch, and an optical directional coupler.

32. The electro-optic device of Claim 30, comprising: 1) an input waveguide; 2) an output waveguide; 3) a first leg having a first end and a second end, the first leg being coupled to the input waveguide at the first end and to the output waveguide at the second end; and 4) a second leg having a first end and a second end, the second leg being coupled to the input waveguide at the first end and to the output waveguide at the second end.

1 33. The electro-optic device of Claim 30, comprising: 1) an input; 2) an output; 3) a first  
2 waveguide extending between the input and output; and 4) a second waveguide aligned  
3 to the first waveguide and positioned for evanescent coupling to the first waveguide.

1 34. An optical router including the electro-optic device of Claim 30.

1 35. A communications system including at least one electro-optic device of Claim 30.

1 36. A method of data transmission comprising transmitting light through the composition of  
2 Claim 1.

1 37. A method of telecommunication comprising transmitting light through the composition  
2 of Claim 1.

1 38. A method of transmitting light comprising directing light through or via the composition  
2 of Claim 1.

1 39. A method of routing light through an optical system comprising transmitting light  
2 through or via the composition of Claim 1.

1 40. A phased array radar system comprising the composition of Claim 1.